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PREMIER ISSUE

Vol. I No. 1

THE PORTABLE COMPUTING MAGAZINE

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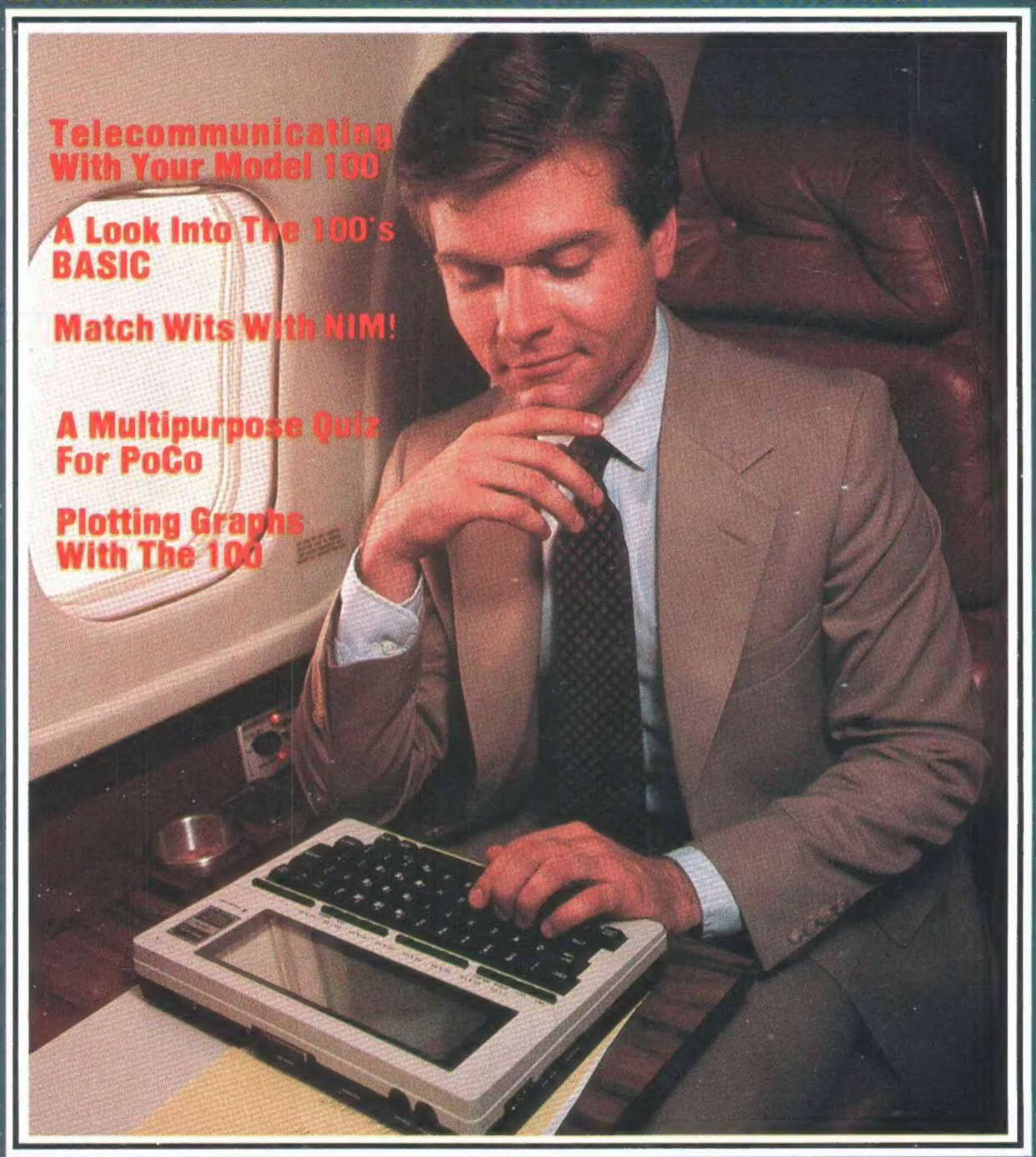

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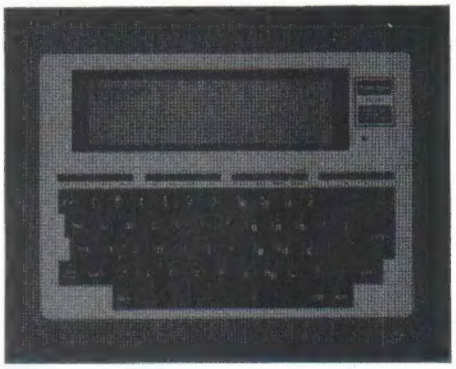

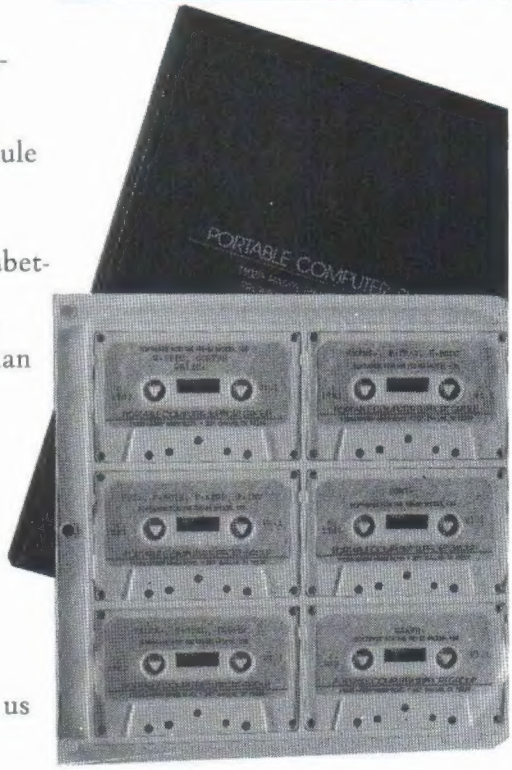

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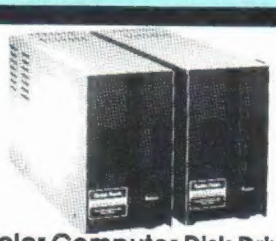

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Join Us For A World Of Portable Computing.

We're glad you picked up this inaugural copy of ***PCM — The Portable Computing Magazine*** and we hope you'll like us.

We are the people who publish ***the Rainbow***, the leading magazine for the TRS-80 Color Computer. By deciding to publish a second magazine devoted exclusively to one model of the TRS-80 family, we plan to adapt the formula which carried ***the Rainbow*** to the top of its field.

In a word, we expect to be a success because of *you*. We won't confuse you with a lot of computer gibberish, we don't plan to devote a lot of space to a whole number of arcane "secrets" of the Portable Computer that you probably won't use and will care about even less. But, most important of all, we expect to have a user-oriented magazine that will answer your needs and interests.

We hope this inaugural issue of ***PCM — The Portable Computing Magazine*** will give you some idea of what we will be trying to do.

For example, Robert Frowenfeld's lead article on making graphs with the Portable Computer and the Radio Shack Color Graphics Printer should give you some idea of the versatility built in to your new Model 100. Robert, one of our contributing editors, also begins a series called "On The Road," which will give you both some ideas and practical methods for using your Portable while away from home base.

We think the software built into the Portable Computer is super. This month we'll show you how to be sure the sorting utility works that is printed in the manual that came with your 100. That is, we'll alert you to a possible problem that could occur. In future issues, we'll be showing you other things you can do with the "ADDRESS" and "SCHEDULE" programs that are built in.

We firmly believe the Portable Computer isn't all for business. But, Vincent Lord has a couple of short programs which you can use in figuring out business-type problems. We hope you will find them useful. Also, there is a full-scale loan amoritization program that will let you know a great deal about money at interest.

Did we say that the Portable Computer can be fun, as well as useful? Well, there is our ***NIM*** program, too. Great fun. Try to beat your computer. Let us know if you do.

And, no one has ever disputed the educational value of a computer. So, our ***QUIZ*** program can teach Spanish or French, geography or just about anything else. It is built to drill the youngsters around you on just about any subject. All you have to do is plug in the questions and answers.

There are a few other things here, too. Including advertisments. Take note of them. And, please, mention our name when you do place orders. It will help us grow and, in growing, we will be able to better serve you.

Yes, do please consider ***PCM — The Portable Computing Magazine*** as *yours*. We welcome your suggestions and thoughts. We encourage you to send us your programs and hints. Address them to PCM Submissions Editor. (We'll pay for contributions.) And, please use our "Letters" column to tell all the other Portable Computer owners out there things you have found out — or ask something you want to know. (No, don't look too hard for the "Letters" column this month, it isn't here. We have to have a magazine before we can get any letters, don't we?)

And, we want to make you aware of the ***PCM*** **Certification Seal.** It will be your assurance of the working existence of a product for your Model 100.

You may be interested in learning about some of the people who are on the masthead of this issue. Our managing editor, Courtney Noe, was ***the Rainbow's*** first editorial employee. He has a lengthy and varied background in magazines and journalism and a Model 100 he proudly calls his own. Jerry McKiernan, our art director, planned the "look" of this magazine and also has worked on ***the Rainbow***, among other publications.

Charlotte Ford, our advertising manager, will assist you with any advertising needs you may have and Ivanka Kleier, our customer service manager, will help you with any subscription questions you may have. Pat Hirsch, our general manager, will always be ready to assist in almost anything.

But the most important member of our staff is *you!* We look to you for help, input and contributions. We will listen to your wants and needs. And, together, we hope to have an outstanding magazine that will support an excellent computer.

We look forward to working for you and with you.

—The Editors

Portable Computing Will Be Your Key To A New World

Hello. And welcome to *PCM*. We believe you're going to like us.

For the record, *PCM* is brought to you by the same people who publish a magazine for the TRS-80 Color Computer called *the Rainbow*. And many of the things which have made that magazine the leader in its field will apply to *PCM*, too.

As you can obviously tell from the heft of this issue, we intend for *PCM* to start sort of small and grow with you and your portable computer. And, while we believe we have enough information in these pages to keep you busy, don't be surprised if, a year from now, you end up holding a magazine that's more than 100 pages.

We believe there is a great future for your portable computer and for you. *PCM* intends to be part of that future and to share it with you.

This being our inaugural issue, I thought you would be interested in what *PCM* will be and what it will not be.

First of all, we are an independent magazine. We are not *sponsored* by any company or software firm. That's important, because we plan to carry extensive reviews of all sorts of products—hardware, software and firmware—that will be available for your Portable Computer. In so doing, we will be able to be independent and to give you fair and accurate information about anything you might consider purchasing.

Second of all, we *are not* in the software business. Yes, our plans include the possibility of offering you programs which appear in *PCM* on tape at some time in the future. But, we will not be hawking products of our own.

Why not? Because we wish to remain independent. And we want you to be certain that, when we evaluate a product, we will evaluate it without concern about anything that we might be selling.

Third, you will find that we have no ax to grind with any company, individual or organization. You should be aware that this includes Radio Shack and Tandy Corp. When we see something good, we'll say so. And when we see something we don't like, we'll say that, too. But, in keeping with good journalistic practice, when we *do* print opinion, we'll label it as such.

Most important of all, we intend to be a readers' magazine. We will publish programs you can use —and we'll ask you to send along those in which you think others will be interested. Yes, we will pay you for them. Just let us know whether you want remuneration.

We intend to have a lively and informative "Letters To The Editor" feature, an "insider's" column so you'll know the latest news of what's happening that affects your Portable Computer, tutorials on how to use the various functions and many more features — some of them on specific areas of interest.

But, most of all, we intend to have programs. Programs you can key in and use. We'll give you information about how a program works (whenever possible) so you can learn while typing them in. But, remember, *PCM* is a magazine that you will be able to *use*. We'll be short on theory and long on practical applications.

Also, don't expect to see a lot of material (or any, for that matter) about "other" computer systems. We're a specialized publication devoted to the Portable Computer. That means simply that you won't have to "wade through" a lot of other material to find something of interest to you. And, while some programs — due to memory requirements —may not run on *your* own machine, all will be written to run on your own Portable Computer. That's a big bonus to you, because everything here is applicable to you!

You should know there is genuine enthusiasm here at *PCM* for the concept of portable computers. And, too, there is excitement about the TRS-80 Model 100 Portable Computer. Yes, we will probably get into some of the other portables. We find that many applications are similar.

We believe you will share our excitement about portable computing. It opens up avenues which never were open before. We hope you will consider us to be *your* magazine, that you will tell your friends and associates about us and that you will mention our name when contacting advertisers. That's important to us, but it is important to you, too. As we grow, we will be able to offer more pages, more information and more portable computing insight than we can without your support.

We look forward to our association with you.

Please contact us if we can help or work with you in any way.

—Lonnie Falk

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PLOTTING GRAPHS with the MODEL 100

By Robert Frowenfeld

One of the biggest advantages of having a computer is the ability to perform operations that would normally be either too tedious or even impossible to do manually. Plotting graphs has always been one of those things that I knew a computer could do more quickly and accurately than I could by hand. Whether plotting a mathematical equation, your corporation's sales history, or even the Dow Jones industrials average, a well designed graph drawn by a computer can be very helpful. Instead of pouring over columns of figures, the person viewing a graph can immediately pick out trends and/or changes and get a much better understanding of what the numbers actually mean.

I've found that using the Model 100 Portable Computer along with the Color Graphics Printer (CGP-115) produces super multi-color graphs. The CGP-115 uses roll paper which is 4" wide. While four inches may not seem like it would be wide enough to produce an acceptable graph, the CGP-115 has the ability to print as many as 80 characters on a 4" line, and can rotate characters 90 degrees in any direction.

The accompanying program was originally designed to run on a TRS-80 Model 16, and has been successfully adapted to run on the Model 100. The program takes up a little less than 6K of memory and will easily run on a machine equipped with 16K. In order to run this program, two data files must be created. One defines the graph titles, X and Y axis scales and axis labeling information. The second file (see Listing #3) contains the data to be plotted. When setting up the two files, a special convention must be used for the filenames so that the plotting program will know where to find them. In this example, I named the *format* file TESTF.DO and the *data* file TESTD.DO. The extension ".DO" indicates that the files are ASCII character files, similar in nature to any document file created with the *TEXT* program that comes installed on the Model 100. When naming the files, the same name must be used with the last character in the name of the format file; an "F" (for format) and the last character of the data file a "D" (for data). Since the Model 100 allows up to six characters for the filename, the format and data files can have unique titles up to five characters in length with the last character an "F" or "D." When the program is run it will ask for the filename to be plotted. In the example here, where the format and data files are named TESTF.DO and TESTD.DO respectively, the proper response is to enter the four-character name TEST. Once the ENTER key is pressed the CGP-115 starts plotting.

To generate the format file, I used the *TEXT* program that comes with the Model 100. The format file items and their type (alpha or numeric) are listed in Table 1. Following is a description of each item's purpose:

Table 1

Item #	Description	Type
1	Main Graph Title	Alpha
2	Sub-title	Alpha
3	X-Axis Title	Alpha
4	Y-Axis Title	Alpha
5	Grid	(Y or N)
6	#X Units	Numeric
7	#Y Units	Numeric
8	Smallest X Value	Numeric
9	Largest X Value	Numeric
10	Smallest Y Value	Numeric
11	Largest Y Value	Numeric
12	#X Divisions per unit	Numeric
13	#Y Divisions per unit	Numeric
14	Number of Lines	Numeric
15	X axis label format	Alpha
16	Y axis label format	Alpha
17	Point Markers	(Y or N)
18	Line Label Print Size	Numeric (0—2)

Following is a brief description of the funtion each of these items plays in formatting the graph.

1—4) These titles can be of any length. The number of characters should be kept reasonably small, especially in the case of the Y axis title so that it will fit within the graph boundaries.

5) If a grid overlay is desired this should be a "Y," otherwise "N." This can be rather handy when interpolating the value of a continuous function. In this example, a grid was not used and "N" was entered.

6—7) This is the number of units to be labeled on each axis. Do not include the first point to be labeled (the origin) when counting; the program does this automatically.

8—11) These are the lowest and highest values on the X and Y axes. Note that these are not necessarily the maximum and minimum values of the data points to be plotted, but the lowest and highest values that will be labeled on the axes. The program won't check to see if your data actually fits within these limits, so these values should be selected with care.

12—13) This is the number of divisions into which each unit on the X and Y

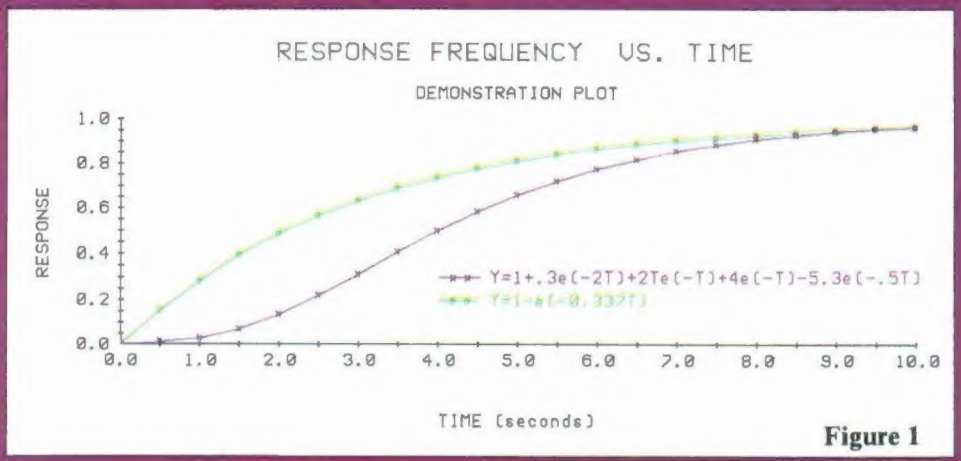

Figure 1

axes is to be divided. In the case of the example, a value of 2 was specified for the X axis and 4 for the Y axis. This resulted in two and four divisions between each labeled numeric value on the X and Y axes respectively. A value greater than or equal to 1 must be specified for these values.

14) Any number of lines can be specified here; the example uses two.

15—16) The format for the printing of the values along the X and Y axes has the format "m.n," where m is a series of "#" characters used to represent the number of digits to the left of the decimal point and n is a series of "#" characters to represent the number of digits to be printed to the right of the decimal point. For example, if the numbers to be printed along one of the axes were in the range of 0—100, then the appropriate format would be "###." In the example used for the plot appearing in this article, formats for the X and Y axes were chosen as "##.#" and "#.#" respectively. Had the Y axis format been "#.##," for example, the values would have appeared as "0.00," "0.20," "0.40," . . . "1.00."

17) If the value of this is specified as "Y," then a marker will be placed at the position of the data point. The marker is specified later on in the line specifications. The example in this article uses point markers. If markers are not desired, use the character "N."

18) This is the size of print used to print the line titles and can have an integer value of 0, 1, or 2. Using the value 0 will result in extremely small print, 20 pitch, or 80 characters on a 4" line, to be exact. Size 1 is used in the example and results in 10 characters per inch. Size 2 can be used and prints large letters (6.7 characters per inch).

For each line, the following information must be supplied:

a)	Line Type	Numeric
b)	Line Title	Alpha
c)	Next Line	(Y or N)
d)	Number of Points	Numeric
e)	Line Color	Numeric
f)	Marker Character	Alpha
g)	X Title Position	Numeric
h)	Y Title Position	Numeric

a) The line type has a value of (0—15) and corresponds to the line type described in the CGP-115 manual. There are 16 different types of lines, ranging from a solid line to several types of dashed lines to a very fine dotted line. In the accompanying example, the line type used was 0; this generates a solid line.

b) The line title can be of any length. Care must be taken to position the title so that it fits within the boundary of the graph.

c) Next line indicates if there are more lines to plot. The example here contains two lines. For the first line a "Y" is used to indicate that there is a second line to plot. The second line is also the last line so a "N" is used.

d) This is the number of points the line contains. Our example's lines each contain 21 data points.

e) Line color is indicated as follows: 0 = black, 1 = blue, 2 = green, 3 = red.

f) The marker character must be specified, and can be any one of the 96 characters the CGP-115 can print. This includes: 0—9, A—Z in both upper and lower case, and some special symbols such as !"#$%'()*+,-/:;<=>?@[]. Even if marker symbols are not desired, a character (even a blank) must be declared.

g,h) These are the X and Y coordinates of the starting position of the line title (item "a" above). These are defined in terms relative to the scales printed along the X and Y axes. If, for example, we had wanted to print the titles at the bottom of the graph (below the X axis) the Y coordinate would have been in the neighborhood of -0.3. Keep in mind when determining the starting position for the line title that a sample line ½" long will be printed at that position with the title printed just to the right.

The data file (Listing 3) was generated by the program in Listing 4. The format of the data file is as follows. The first item in the data file is the number of lines for which there is data; two in this case. Next, each line of the sequential data file consists of a series of X,Y pairs of numbers separated by a comma. After the last X,Y pair is the point 999.999,999.999; this tells the program there is no more data for this line and the next data is for the following line.

With a little bit of practice, anyone with a Model 100 and CGP-115 can generate neat, impressive line graphs. I use a modified version of this program to chart my stocks by plotting prices, volumes and moving averages. I know several people who are using this program to keep an eye on sales figures and productivity performances.

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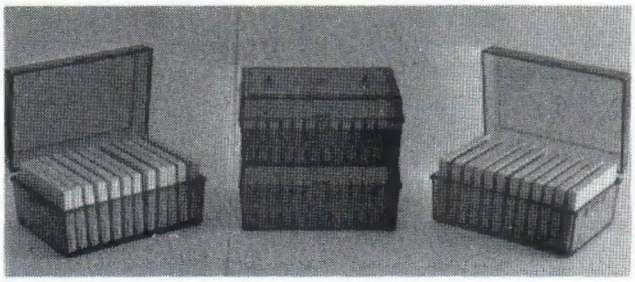

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Listing 1:

```
1 CLEAR1000:DEFINT I-Q,W:DEFSTR A,R,Z:DE
FDBL P:DEFSNG X,Y:I=0:J=0:CLS 'prun
2 R1$=CHR$(27)+"p":U$=CHR$(27)+"q"
4 MD=100
5 GOTO71
30 A!=X:B!=Y:GOSUB44:LPRINT"D"+XY$:RETUR
N
31 A!=X:B!=Y:GOSUB44:LPRINT"M"+XY$:RETUR
N
32 GOSUB48:LPRINT"D"+PT$:RETURN
41 A$=U$+STRING$(20-LEN(A$)/2," ")+A$+EL
$:RETURN
42 IE$=STRING$(8-LEN(IE$)," ")+IE$:RETUR
N
43 PN$=LEFT$(STR$(A#),7):RETURN
44 XY$=STR$(A!)+","+STR$(B!):RETURN
45 AX$="X0,"+STR$(I)+","+STR$(J):RETURN
46 AY$="X1,"+STR$(I)+","+STR$(J):RETURN
47 CW!=480/(80/(1+A!)):RETURN
48 PT$=STR$((Y!-SY)*FY)+","+STR$((-X!+SX
)*FX):RETURN
71 TX$=CHR$(17):GR$=CHR$(18):RP$=CHR$(29
):XA=840:YA=240
95 DIM X(64),Y(64)
100 CLOSE:CLS
110 A$=R$+" CGP-115 Plot Generator "+U$:
GOSUB41:PRINTU$;A$
120 PRINT@85,U$" Enter File to Plot :
          "R;STRING$(12,8);:LINEINPUT IN
$:IF IN$="" THEN 9999
122 IF LEN(IN$)>4 THEN 120 ELSE A=LEFT$(
IN$,1):IF A<"A"OR A>"Z" THEN 120
124 IF MD=16 THEN ID$=IN$+"/LIN" ELSE IF
 MD=100THEN ID$=IN$+"F.DO"
125 IE$=IN$
130 GOSUB9000:IFST=0THEN120
140 GOSUB6500
190 A$=" Press ENTER key to start plotti
ng":GOSUB41:PRINT@160,A$;:LINEINPUTIN$
191 IFIN$="H"THENRUNELSEA$="Plotting ...
 ":GOSUB41:PRINT@240,A$;
199 GOTO2000
300
310 IFTT$=""THENRETURN
320 L=LEN(TT$)
330 CL=80/(1+SZ)
340 CW=480/CL
350 Y=-(XA/2)+L/2*CW
360 X0=X:Y0=Y:GOSUB31:LPRINT"S"+CHR$(48+
SZ):LPRINT"Q1":LPRINT"P"+TT$
370 RETURN
400
410 IFTT$=""THENRETURN
420 L=LEN(TT$)
430 CL=80/(1+SZ)
440 CW=480/CL
```

```
450 X=(YA/2)-L/2*CW
460 X0=X:Y0=Y:GOSUB31:LPRINT"S"+CHR$(48+
SZ):LPRINT"Q0":LPRINT"P"+TT$
470 RETURN
500 '
505 IFLEFT$(R$,1)=" "THENR$=MID$(R$,2)
510 IFLEFT$(R$,1)="-"ANDABS(VAL(R$))<1.0
THENR$="-0"+MID$(R$,2)
515 D1=INSTR(R$,"."):D2=INSTR(FZ$,".")
520 IF D2=0 AND D1<>0 THEN R$=MID$(R$,1,
D1-1)
525 IF D1=0 AND D2<>0 THEN R$=R$+".":D3=
LEN(MID$(FZ$,D2+1)):IF D3<>0 THEN R$=R$+
STRING$(D3,"0"):D1=INSTR(R$,"."):GOTO535
530 IF D1=1 AND D2>D1 THEN R$=STRING$(D2
-D1-1," ")+"0"+R$:D1=INSTR(R$,".")
535 IF D2=0 THEN 560
540 '
545 D3=LEN(MID$(R$,D1+1)):D4=LEN(MID$(FZ
$,D2+1))
550 IF D3<D4 THEN R$=R$+STRING$(D4-D3,"0
")
555 IF D3>D4 THEN R$=MID$(R$,1,D1+D4)
560 '
565 D3=D1-1:D4=D2-1
570 IF D3=-1 THEN D3=LEN(R$)
575 IF D4=-1 THEN D4=LEN(FZ$)
580 IF D3<D4 THEN R$=STRING$(D4-D3," ")+
R$
585 IF D3>D4 THEN R$=RIGHT$(R$,LEN(FZ$))
590 RETURN
600 '
610 J=1
620 IFMID$(R$,J,1)=" "THENJ=J+1:GOTO620
630 R$=MID$(R$,J):XJ=LEN(R$):RETURN
800 '
810 LPRINT"S0":X=PX(LI):Y=PY(LI):X!=X:Y!
=Y:GOSUB48:LPRINT"M"+PT$
812 IFMN$(LI)=""THENX=X+60/FX:GOSUB32:X=
X-60/FX:GOSUB32:X=X+60/FX:GOSUB32:GOTO82
0
815 X=X+15/FX:X!=X:GOSUB32:Y=Y-4/FY:Y!=Y
:GOSUB48:LPRINT"M"+PT$
816 LPRINT"P"+MN$(LI):Y=Y+4/FY:Y!=Y:GOSU
B48:LPRINT"M"+PT$
817 X=X+15/FX:X!=X:GOSUB32:Y=Y-4/FY:X!=X
:Y!=Y:GOSUB48:LPRINT"M"+PT$
818 LPRINT"P"+MN$(LI):Y=Y+4/FY:X!=X:Y!=Y
:GOSUB48:LPRINT"M"+PT$:X=X+15/FX:X!=X:Y!
=Y:GOSUB32
820 Y=Y-8/FY:X!=X:Y!=Y:GOSUB48:LPRINT"M"
+PT$:LPRINT"S"+PS$:LPRINT"P "+LN$(LI):RE
TURN
2000 '
2010 LPRINTGR$:LPRINT"A":LPRINTGR$:LPRIN
T"C0":LPRINT"L0"
2020 X0=0:Y0=0:X1=480:Y1=-999
2030 Y=Y1:GOSUB30:X=X1:GOSUB30:Y=Y0:GOSU
B30:X=X0:GOSUB30
2040 X=120:Y=-120:GOSUB31:LPRINT"I"
2050 TT$=T0$:SZ=2:X=300:GOSUB300
2060 TT$=T1$:SZ=1:X=260:GOSUB300
2070 NX=UX*TX:NY=UY*TY:DX=-XA/NX:DY=YA/N
Y
2073 IFDX<>INT(DX)THENXA=INT(ABS(DX))*NX
:GOTO2070
2074 IFDY<>INT(DY)THENYA=INT(ABS(DY))*NY
:GOTO2070
2075 FX=XA/(LX!-SX):FY=YA/(LY!-SY)
2080 LPRINT"H":I=DX:J=NX:GOSUB45:LPRINT
AX$:LPRINT"H":I=DY:J=NY:GOSUB46:LPRINTAY
$
2090 FZ$=FY$:LPRINT"S1":LPRINT"Q1":FORI=
0 TO UY:R$=STR$(SY+I*(LY!-SY)/UY):GOSUB5
00:X=-8+I*DY*TY:Y=+45
2100 A!=X:B!=Y:GOSUB44:LPRINT"M"+XY$:LPR
INT"P"+R$:NEXTI
2110 TT$=YL$:SZ=1:Y=75:GOSUB400
2130 FZ$=FX$:LPRINT"S1":LPRINT"Q1":FORI=
0 TO UX:R$=STR$(SX+I*(LX!-SX)/UX):GOSUB5
00:GOSUB600
2135 X=-25:A!=1:GOSUB47:Y=I*DX*TX+XJ/2*C
W!-3
2140 A!=X:B!=Y:GOSUB44:LPRINT"M"+XY$:LPR
INT"P"+R$:NEXTI
2150 TT$=XL$:SZ=1:X=-90:GOSUB300
2160 IFGD$="N"THEN2200
2165 X=YA:Y=0:GOSUB31:Y=-XA:GOSUB30:X=0:
GOSUB30
2170 X=0:Y=-XA
2175 Y=Y-DX*TX:IFY>=0THEN2190ELSEGOSUB31
:X=YA:GOSUB30
2180 Y=Y-DX*TX:IFY>=0THEN2190ELSEGOSUB31
:X=0 :GOSUB30
2185 GOTO2175
2190 X=0:Y=0
2192 X=X+DY*TY:IFX>=YATHEN2200ELSEGOSUB3
1:Y=-XA:GOSUB30
2195 X=X+DY*TY:IFX>=YATHEN2200ELSEGOSUB3
1:Y=0  :GOSUB30
2197 GOTO2192
2200 '
2205 IFMD=16THENID$=IE$+"/DAT"ELSEID$=IE
$+"D.DO"
2207 GOSUB9000:IFST=0THENGOSUB9400:GOTO1
00
2210 LI=0:INPUT#1,DU%
2230 LPRINT"H":LI=LI+1:NN=N3(LI):IFNN=0T
HENNN=999
2240 FOR M=1 TO N3(LI)
2245 INPUT#1,X1,Y1:IFX1=999.999ANDY1=999
.999ANDM=1THEN2245' search for start
2250 X(M)=X1:Y(M)=Y1:IF N3(LI)<999 THEN
2270
2260 IF X(M)=999.999 AND Y(M)=999.999 TH
EN 2280
2270 NEXT M
2280 LPRINT"C"+PC$(LI):LPRINT"L"+L$(LI)
'select pen, line type
2285 IFX(1)>LX!ORY(1)>LY!THENEM$="Starti
```

```
ng coordinates do not lie within grid bo
undaries":GOSUB9200:GOTO100
2287 GOSUB800 'draw line title
2290 X=X(1):Y=Y(1):X!=X:Y!=Y:GOSUB48:LPR
INT"M"+PT$:LPRINT"S0"
2300 FORI=2TOM-1:X=X(I):Y=Y(I):IFX(I)>LX
!ORY(I)>LY!THEN2320
2310 X!=X:Y!=Y:GOSUB32:IFMN$(LI)<>""THEN
X=X-2/FX:Y=Y-4/FY:X!=X:Y!=Y:GOSUB48:LPRI
NT"M"+PT$:LPRINT"P"MN$(LI):X=X+2/FX:Y=Y+
4/FY:X!=X:Y!=Y:GOSUB48:LPRINT"M"+PT$
2320 NEXTI
2330 IFG$(LI)="Y"THEN2230
2999 A!=0:B!=-999:GOSUB44:LPRINT"M"+XY$:
LPRINT"A":LPRINT:RUN
6500 '
6505 GOSUB9300
6510 INPUT#1,T0$,T1$,XL$,YL$,GD$,UX,UY,S
X,LX!,SY,LY!,TX,TY,Q,FX$,FY$,MK$,PS$
6520 FORI=1TOQ:INPUT#1,L$(I),LN$(I),G$(I
),N3(I),PC$(I),MN$(I),PX(I),PY(I):NEXTI
6530 CLOSE:RETURN
7000 'end
7010 STOP
9000 'fileid
9010 ONERRORGOTO9100
9030 ST=1:IFMD=16THENOPEN"I",1,ID$ ELSE
OPEN"RAM:"+ID$ FOR INPUT AS 1
9040 RETURN
9100 IF ERR=52 THEN ST=0:GOSUB9400:RESUM
E 9040
9110 PRINT:PRINT"Error #"ERR;"in line"ER
L:STOP
9200 CLS:PRINTEM$:STOP
9300 FORI=1TO10:N3(I)=-999:AB$(I)="A":G$
(I)="N":LN$(I)="":L$(I)="":PC$(I)="":MN$
(I)=""
9310 PX(I)=999.999:PY(I)=999.999:NEXTI:R
ETURN
9400 A$=U$+"File "+R1+" "+ID$+" "+U$+" d
oes not exist. "
9410 PRINT@164,"  "A$;:A$="Press any key
 to continue ":PRINT@246,A$;:LINEINPUTIN
$:RUN
9999 CLS:IF MD=16 THEN END ELSE MENU
10000 IF ERR=56 THEN RESUME ELSE ON ERRO
R GOTO 0
```

Listing 2:

```
"RESPONSE FREQUENCY  VS.TIME"
,"DEMONSTRATION PLOT","TIME (seconds)"
,"RESPONSE",N, 10 , 5 , 0 , 10 , 0 , 1.0
 , 2 , 4 , 2 ,##.#,#.#,Y,1*
0,Y=1+.3e(-2T)+2Te(-T)+4e(-T)-5.3e(-.5T)
,Y, 21 ,1,X, 4 , 0.3 *
0,Y=1-e(-0.337T),N, 21 ,2,0, 4 , 0.2 *
```

Listing 3:

```
2
0.0, 0
0.5, .01537
1.0, .03326
1.5, .07330
2.0, .13841
2.5, .22231
3.0, .31602
3.5, .41144
4.0, .50261
4.5, .58583
5.0, .65929
5.5, .72248
6.0, .77579
6.5, .82005
7.0, .85636
7.5, .88586
8.0, .90963
8.5, .92867
9.0, .94383
9.5, .95586
10.0, .96537
999.999 , 999.999
0.0, 0
0.5, .15506
1.0, .28609
1.5, .39679
2.0, .49033
2.5, .56936
3.0, .63614
3.5, .69256
4.0, .74024
4.5, .78052
5.0, .81455
5.5, .84331
6.0, .86760
6.5, .88813
7.0, .90548
7.5, .92014
8.0, .93252
8.5, .94298
9.0, .95182
9.5, .95929
10.0, .96561
999.999 , 999.999
```

Listing 4:

```
5 OPEN "TESTD.DO" FOR OUTPUT AS 1
10 FORI=1TO2
20 FORX=0 TO 10 STEP .5
30 ON I GOTO 40,50
40 Y=1+.3*EXP(-2*X)+2*X*EXP(-X)+4*EXP(-X
)-5.3*EXP(-.5*X):GOTO60
50 Y=1-EXP(-0.337*X)
60 PRINTX;",";LEFT$(STR$(Y),7)
70 PRINT#1,USING"##.#";X;:PRINT#1,",";LE
FT$(STR$(Y),7)
78 NEXTX
79 PRINT#1,"999.999 , 999.999":PRINT"999
.999 , 999.999"
80 NEXTI
```

PCM

Telecommunications and the Model 100

By Bob Rosen

The Radio Shack Model 100 is a forerunner to a new generation of briefcase computers. I have traveled with a Color Computer, and after a while found it to be quite a hassle.

Before buying the Model 100, I saw many features I wish I had available before. I spend a lot of time on airplanes, and the Model 100 would seem an excellent way to type in long listings for any computer and then upload them later. The text editor is excellent; I'm glad to see it in ROM. The BASIC looks fantastic, with plenty of I/O commands for the RS-232 and modem ports; with 16-digit precision, it's great for scientific applications.

The area I was mainly interested in was the telecom features, and the balance of this review will concentrate on that area. First, I was using an 8K machine which booted up and allowed only about 5K for the user. I called up a BBS that had download programs on it and felt that it filled up too fast. As far as I'm concerned, the memory upgrades are somewhat expensive, but competition from the prophesied Model 100 lookalikes will probably take care of that problem. Five K is just not enough memory for any serious telecom work. If you *are* serious about this, 32K of memory is—in my opinion—a must.

I hooked the 100 to my Color Computer with no problems. I loaded up ColorCom/E in my Color Computer and easily downloaded a small text program from the Model 100; going the other way was just as easy. When I tried chatting with another CoCo user, I ran into a problem in that I was unable to get the Model 100 to line feed. I'm sure that two Model 100s connected together would have twice the problem. It would have been nice if Radio Shack had built in a user selectable automatic line feed insert capability at least to give its own display a line feed. A good example of a telecom program with this capability is Eigen's ColorCom/E.

I connected the modem cable to the Model 100 and had no problem checking into several bulletin boards. My real disappointment came when I tried to upload a file. A couple of bulletin boards took the file without problems, but several of them would drop characters at the beginning of each line during an upload. I noticed there was no pause between lines sent from the Model 100, and apparently most BBS's do a little processing between each line received.

I tried uploading to a Flex system, using the BUILD command, and I was completely out of luck because the BUILD utility does a disk access after each carriage return. An option to send a line at a time would have been helpful, as well as some sort of programmable line delay. I even ran into an Atari-based BBS that wouldn't read any characters at all because it seemed to have a certain amount of intercharacter delay.

The bottom line of all this is that the upload feature is going to need a little work before it is universally usable. Tandy should have field tested this feature on something besides a Model II and CompuServe.

As far as the attractive features of the machine are concerned, the download feature worked well. I really liked the constant memory feature. I had to shut the computer off in a hurry several times, and the ability to store and call up numerous files without disk or tape adds real value. The Model 100 is impressive looking and fits well in an office. It's nice to be able to take a computer to work without having to rent a truck. The 40 x 8 display is easy to read, and I really liked the ability of the display to flip to the previous page of text during the telecom mode. I wish Radio Shack had incorporated this into the text editor. I also really liked the auto dial feature; it worked satisfactorily for me dialing at 20 pulses per second, although it can be slowed down to 10 PPS.

A few other things I observed about the machine that might be useful to the potential buyer are listed here. I removed a cover on the bottom of the machine and found a ROM socket (I hope they will sell a spreadsheet soon) and a bus connector. I would like to see some articles pertaining to the use of that bus connector, as well as theory of operation for these new low power chips. I would like to point out that the cassette cable is the same as the one used on the Color Computer, and the Model 100 loads at the same rate (1500 baud) as the Color Computer, which is really quite good. One other thing I noticed is that the modem seemed a little insensitive when trying to receive. I was using a marginal phone line and was able to transmit just fine; however, everything I received was garbage. A different modem and terminal on the same line yielded good results.

To sum it all up, I believe the Model 100 is a good computer with lots of potential—with a little work, it could be a great computer. I mean for the criticism in this article to be constructive, and I hope that The Shack will bring about enhancements quickly. Otherwise, we will again have to rely on outside vendors. I'm not so sure that other manufacturers will leave such a fantastic concept alone for very long. I forsee several Model 100 lookalikes ready for release before Christmas. Maybe by the time this article is released we will see one. PCM

(Bob Rosen is president of Spectrum Projects and runs three Color Computer bulletin boards.)

Financial Ratios Can Help Determine Corporate 'Soundness'

By Vincent Lord

Financial ratios are conveniently used to determine the manner in which a company is operated. If you deal with investments, such ratios are useful guidelines to determine the financial condition of the company. Since these ratios are based upon the balance sheet, the data you need is often published with the annual report. The net profit to sales ratio and the return on investment ratio are two means of determining profitability; the current ratio is a statement of liquidity. The program listed below allows the calculation of the ratios which when compared with previous years' ratios can help determine the "soundness" of a company.

The program will accommodate numbers up to those of the largest U. S. corporation without the unnecessary "cents." The output is in the form of fractions. If you wish to express the results in percentage, change lines 260, 360, and 460 to PRINT USING "###.#+" ;XX*100, where XX is the ratio, i.e. PS, RI, or CR. Good luck with your investments.

The listing:

```
10 CLEAR 100
15 A$="**************************"
20 CLS:PRINT"****BUSINESS RATIOS****"
30 PRINT"(1) NET PROFIT ON SALES RATIO"
40 PRINT"(2) RETURN ON INVESTMENT"
50 PRINT"(3) CURRENT RATIO"
55 PRINT"(4) END PROGRAM"
60 PRINT"SELECT 1, 2, 3, OR 4";
70 N$=INKEY$
80 IF N$="" THEN 70
90 ON VAL(N$) GOSUB 200,300,400,999
100 GOTO 20
200 REM***NET PROFIT ON SALES***
210 CLS
215 PRINT"***NET PROFIT ON SALES***"
220 INPUT"NET PROFIT ";NP
230 INPUT"NET SALES  ";NS
240 PS=NP/NS
250 PRINT A$
260 PRINT:PRINT"NET PROFIT ON SALE";:PRI
NT USING "###.###+";PS
270 GOSUB 550
280 RETURN
300 REM***RETURN ON INVESTMENT*
310 CLS
315 PRINT"***RETURN ON INVESTMENT***"
320 INPUT"NET PROFIT   ";NP
330 INPUT"TOTAL INVESTED CAPITAL  ";TC
340 RI=NP/TC
350 PRINT A$
360 PRINT:PRINT"RETURN ON INVESTMENT";:P
RINT USING "###.###+";RI
370 GOSUB 550
399 RETURN
400 REM***CURRENT RATIO***
410 CLS
415 PRINT"***CURRENT ASSETS***"
420 INPUT"CURRENT ASSETS   ";CA
430 INPUT"CURRENT LIABILITIES   ";CL
440 CR=CA/CL
450 PRINT A$
460 PRINT:PRINT"CURRENT RATIO";:PRINT US
ING"###.###+";CR
470 GOSUB 550
480 RETURN
550 PRINT:PRINT"PRESS <ENTER> TO RETURN
TO MENU";
560 IF INKEY$=CHR$(13) THENRETURN ELSE 5
60
570 RETURN
999 MENU
```

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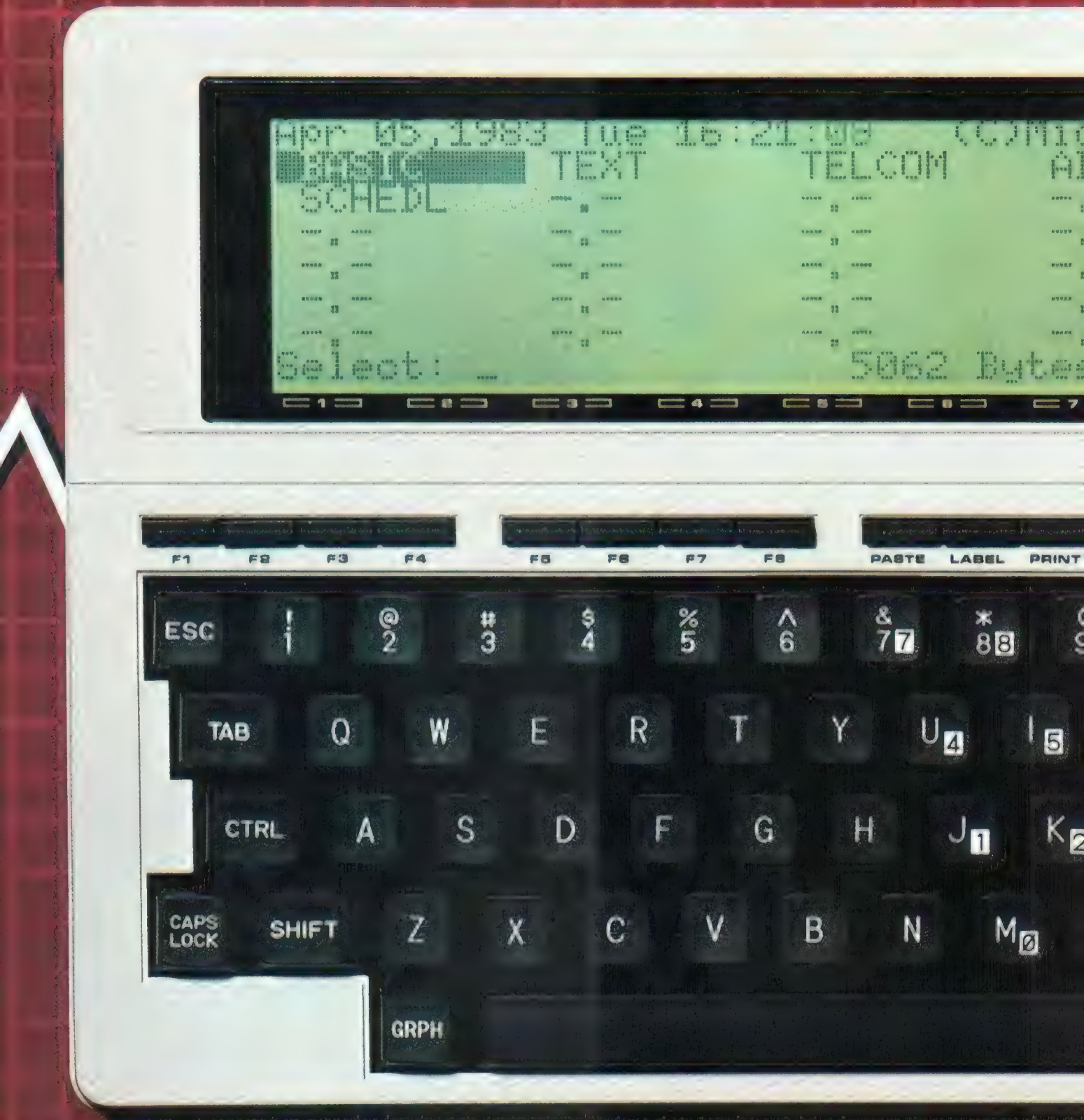

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Glancing at the New 100's Version of BASIC

Well, I've just sat down and taken a good look at the Model 100's version of BASIC that (as with all other TRS-80s) was developed by none other than our good friends at Microsoft. This version of BASIC has a few new commands and that's what we're going to examine today. While there are many new and specialized commands available for such esoteric uses as accessing the communications port, renaming and merging files, etc., I'm going to key on those commands that the "average" BASIC programmer (if there is such a thing) will find the most useful and interesting.

Looking at all the commands available (in alphabetical order), the first "stranger" I see is the BEEP command. Using this command will cause the sound generator in the Model 100 to emit a tone for ½ second. This certainly comes in handy when designing a program to signal a user when he or she has made an error. Say, for example, that we have use for a subroutine that requests a response to a "yes or no" type question; the following routine could be used to prompt the user with an audible tone that a "Y" or "N" was not entered:

```
100 LINE INPUT A$
110 IF A$="Y" OR A$="N" THEN      RETURN
120 BEEP
130 GOTO 100
```

The next new command I see is the CALL command. This is used to call a machine language program in much the same way that the Model I, II, III, etc., uses the USR statement. The syntax of the CALL command is:

CALL address,expression1,expression2

where address is the decimal address of the beginning of the machine language program. Expression1 is optional and, if used, passes an integer argument to be loaded into the "A" register prior to jumping to the machine language routine. Expression2 is also optional and, if specified, will load the HL register pair with the integer number specified; an excellent method of passing the beginning address of an array or stack pointer. If you're planning to write some nifty sorting or block move type of routines in machine language, this is the way to go! This command supplies the machine language programmer with a more useful tool than the familiar USR function in that now two arguments can be passed to the machine language program.

One of the new functions the Model 100 has to offer is CSRLIN. This variable name is reserved to contain the numeric value of the current line position (0—7) of the cursor; this might come in handy if designing a game or drawing program where the user is trying to produce a screen format. A couple of other new variable names are DAY$ and DATE$; these contain the first three letters of the day (Mon, Tue, etc.) and the day as MM/DD/YY respectively. Incidentally, these (DAY$ and DATE$) can appear on the left side of an equation to set the day and date.

The FILES command lists to the video display all Model 100 files that are stored in RAM. This is just like issuing a DIR command from TRSDOS for you TRS-80 disk drive owners. It is interesting to note that the Model 100 treats everything—program, data file, text file—as a sequential data file. This means, oddly enough, that when you are in BASIC and are working on a previously saved program, it is an OPEN file! You see, the RAM in the Model 100 is a sort of combination RAM and disk drive. Therefore when you type FILES, the program that you are working on has an asterisk displayed to the right of it, indicating it is currently an open file. A word to the wise: don't attempt to KILL the program you are currently working on. As it *is* an open file, the "operating system" (if you'll pardon the expression) won't let you KILL it. Instead, type NEW, and then KILL "filename."

For those of you familiar with the MEM function, the Model 100 uses a different, yet not unknown, command: FRE. If used in the form X=FRE(0), the variable "X" will contain the amount of available memory remaining. When used as X=FRE(A$) or X=FRE(""), the variable "X" will contain the amount of unused cleared string space.

Another new command is HIMEM. This reserved variable contains the address of the highest location in memory available to BASIC. As with DAY$ and DATE$ described earlier, HIMEM can appear on the left side of an equation to set the top of BASIC memory—a must for the machine language programmer if he wants his code protected!

The KEY command allows the eight function keys on the Model 100 (labeled F1-F8) to be customized. For example, the statement:

KEY 1, "PRINT FRE(0)"+CHR$(13)

will display the amount of free memory available whenever the F1 key is pressed. This can be entered as an immediate command or may appear as a line of code in a program.

There's a simple command for copying the LCD (liquid crystal display) to a printer: LCOPY. This will copy a display (ignoring graphics symbols) to an attached printer.

Now we're going to get to the good stuff, namely the LINE command. I'm used to programming primarily on a Model 16, so I don't have the luxury of you CoCo owners of a command such as LINE. But the Model 100 LINE command is something else. Not only will it draw a line from point A to point B, but it will also, if requested, draw a box, and even fill it in! The command syntax is

LINE (X1,Y1)-(X2,Y2),switch,BF

and it works like this: X1,Y1 and X2,Y2 are the X and Y coordinates of the pixels on the Model 100 LCD display. There are 240 pixels across and 64 down, so any X coordinate must have the value 0—239, while the Y coordinate must contain a number in the range 0—63. The "switch" parameter, if used, indicates how the line, or box is to be drawn. If the value of switch is odd, BASIC will set the pixels—that is, it will make the pixels dark. If switch is even, it will reset or clear the pixels. If "B" is used, a box will be drawn using the X1,Y1 and X2,Y2 coordinates as corners of the box. If "F" is specified, the box will be filled (or unfilled) as specified by "switch." This command is going to be a real winner with those of you interested in designing grapics programs. Watch for an example of this command in the next issue of *PCM*.

"... It is interesting to note that the Model 100 treats everything—program, data file, test file—as a sequential data file. This means, oddly enough, that when you are in BASIC and are working on a previously saved program, it is an OPEN file!"

The last command I'm going to review today is the SOUND command. It has the syntax: SOUND pitch,length. The variable "pitch" is a numeric value in the range of 0—16383; "length" must have a value of 0 to 255, with 50 equaling approximately one second. The Model 100 manual provides a very nice table covering the pitch values needed to span five complete octaves, including sharps. The SOUND command will be discussed further in the first installment of "The Music Box," a regular feature which will make its debut in the August issue of *PCM*.

We've tried here to give you a sampling of some of the new commands available to the Model 100's BASIC interpreter. All in all, PoCo's version of BASIC can be summed up as an old friend with a fascinating variety of new commands to give the BASIC programmer the tools needed to make the Model 100 operate easily and efficiently. PCM

File Sorting Can be Good, But Beware of Pitfalls

There is an excellent program in the appendix of your Portable Computer manual which shows you how to sort document files (those with a .DO extension). But, there may be two problems with the program and you are advised to take care before using it.

The main problem is a human one, based on the principle that we all make mistakes. Many times we find a program will not "run" simply because we have made an error in typing it into the computer.

(*PCM* is attempting to help fight this problem by printing all of our longer listings in 40-column format—the same as your screen display. You can "line up" the characters one beneath another and that will help you check to see that you have typed them correctly.)

The second problem is the program, as written, uses up quite a lot more memory than is necessary. This is because there are a great number of REMark statements in the sample program — and they use memory. While excellent for debugging and learning,

most of them can be eliminated to save memory space.

However, there are a couple which are important to the running of the program. Since this is the most simple problem to address, we will talk about it first.

Saving Memory

Every line which begins with an apostrophe (') can be eliminated from the program listing which begins on page 202 of the manual, "Sample Session #3: Sorting .DO Files With A BASIC Program", *except* for the following:

```
2000 '
3000 '
```

The reason these two lines cannot be eliminated is because they are used to call subroutines in Lines 1130, 1300, 1320 and 1610. If you eliminate these two lines, the subroutines will have nowhere to go, and you will get an ?UL ERROR.

An alternate way of handling this would be to change all of the GOSUB 2000 commands to GOSUB 2030 and the GOSUB 3000 command to GOSUB 3030. Take your choice, but it is usually easier to leave in Lines like 2000 and 3000 as dummy lines. It also makes your programming cleaner in that you begin subroutines on even numbers.

Beware The KILL

Of greater concern is Line 1645, which tells the Portable Computer to KILL the old file before the new file is written.

The fact of the matter is that by the time you get to Line 1645, you are in the last stages of your program, and the chances that you have done something wrong are pretty small. But, Murphy's First Law ("If Anything Can Go Wrong, It Will") probably applies in computer programming more than anywhere else in the world. And this is a perfect example of how old Murphy can run rampant through your RAM!

For the sake of discussion, let's just assume you typed in Line 1650 with an error — you just hit the wrong key or something.

The program would have KILLed your old document file in Line 1645, but then would break out of program execution at Line 1650 because of the error. And, as soon as you edit the offending line, you lose the array which has all the information in your document file stored in memory.

Have you got troubles!

Suppose you spent two hours putting in names, addresses and telephone numbers into an ADRS.DO file the day before. Then, you decided to sort it with this program. All of a sudden, Murphy has wiped out your two hours worth of typing in one fell swoop of a ?SN error.

What you have to do is make sure your sorting program works exactly right before you try it on any "live" files. Or, you have to make a backup copy of the original file.

Making the backup is easier, but not as much fun. All you need to do is type in CSAVE "ADRS" ENTER and your file will be saved on tape. Then, if the worst happens, just re-load the file back into memory with CLOAD "ADRS" ENTER.

But there is another way to do it, too. And you can have more fun with that.

The Fun Way

What we need to do is create a test file and then use that for debugging the sorting program. Go to the main menu and call up the *TEXT* program. This will allow you to create a file for testing the sorting program.

Since this is going to be a test, call the file TEST. Then, type in your own text file.

We suggest using two or three letters of the alphabet for each listing. So, your TEST file might look like this:

```
ZZZ
YYY
FFF
TTT
QQQ
HHH
```

You can, of course, use as many of the letters of the alphabet as you want. But do not type them in in alphabetical order.

In fact, to see how fast you can sort them under a "worst case" situation, type the alphabet exactly backwards. That will require the computer to handle each series of letters the maximum number of times.

Now, run the sorting program from BASIC. But, instead of using the ADRS file, use the TEST file. If you have an error that ends up killing your source file, all you need to do is create another one — something that can be done in a minute or two. And, that will save you from any problems with your data in the ADRS file.

Once you have the sort working to perfection with your TEST data, just type in KILL "TEST.DO" and run the sort program using your ADRS file.

More Goodies

There are some other things you could do with this program—or the general outline of the program—with just a little modification. One of the most handy, it seems to us, is to print out the contents of the entire file. This would involve changing the write to RAM subroutine (Lines 1645-1690) to a printout subroutine. That way you could get a printout of the entire document file and, if you had sorted it first, you could have a sorted printout.

Assuming your file is structured in the manner which is suggested by the manual, you would also be able to change the way the file is set up. As an example, let's just suppose the first ten spaces are set up for a last name, the next ten for a first name and initial and the next eleven for telephone numbers. You could rearrange the way the file is constructed, using some of the string handling commands such as MID$, LEFT$ and RIGHT$. And, of course, you could print out the rearranged file —without even disturbing the original file, if you wished to do so.

We are very impressed with the construction of the two data base files built into the Portable Computer and believe there will be many applications which will prove useful to its users. PCM

" . . . Murphy's First Law (If Anything Can Go Wrong, It Will) probably applies in computer programming more than anywhere else in the world."

For coffee breaks or unavoidable waits, you can take this little game along. But, be warned, you won't always win when you try to . . .

Match Wits With Nim

All work and no play makes even a Portable Computer owner a dull person—so we offer you a little recreation along with all the serious-type goodies that grace this, our first issue of *PCM*.

In fact, recreation will be a part of *PCM* each month. When you need a little respite from the business trip, if you finish your memos before the plane lands, or in case you just want to *play*, we hope that these recreational moments will be a lot of fun for you. Look for them to become a regular part of *PCM*.

And, what better way to start than with a "traditional" computer game that will, on one hand, show how smart your Portable Computer is and, at the same time, show off some of its graphic capabilites. The name of the game is *NIM*, and we're willing to bet that you can't beat the computer (but you might).

NIM is based on the simple principle that you and your opponent each take turns at taking one or more little people away from one of three rows of figures. You can take all of the people in a certain row—or only one of them. The winner is the one who is successful in taking the last person or people. You cannot take people from more than one row at a time, so, as you see, there is a bit of planning involved.

The computer starts out real friendly, asking you whether you want to go first or not. But, then, it starts playing in earnest and won't give any quarter. See whether you can win.

Note that you do not have to press the ENTER key to make any of your commands work. This version of *NIM* uses a special INKEY$ routine that lets you just enter a response in most cases. When you do have to press ENTER, the program will tell you.

Don't expect to win the first time out. But, you will have an option to play again. If you choose not to play again, the program returns you to the Model 100's Main Menu.

The people rows are numbered from top to bottom, with row one being at the top. There are seven people in row one, five in row two and three in row three.

Good luck!

The listing:

```
10 CLEAR200:DEFINTA-Z
15 CLS
20 P(1)=140:P(2)=222:P(3)=304
30 N(1)=7:N(2)=5:N(3)=3
40 X(1)=0:X(2)=1
50 CM=2
60 IFCM=2THENK=VAL(RIGHT$(TIME$,2)):FORI
=1TOK:L=RND(1):NEXTI
100 GOSUB1000
110 IR=3:IC=4:GOSUB600:PRINT@Q,"Do you w
ant";
120 IR=4:IC=4:GOSUB600:PRINT@Q,"to go fi
rst?";
125 IR=5:IC=8:GOSUB600:PRINT@Q,"";
130 PL=0:A$=INPUT$(1):IFA$="Y"ORA$="y"TH
ENPL=1ELSEIFA$="N"ORA$="n"THENPL=2
135 IF CM=2 AND PL=0 THEN BEEP:GOTO 110
ELSE IF CM=1 AND PL=0 THEN 110
140 PRINTA$;:GOSUB900:GOSUB1200
150 IR=4:IC=0:GOSUB600:PRINT@Q,STRING$(1
7," ");:IR=3:IC=1:GOSUB600:PRINT@Q,"O.K.
 Buddy,";:IR=5:IC=1:GOSUB600:PRINT@Q,"";
:IFPL=1THENPRINT"You";ELSEPRINT"I'll";:E
X=1
160 PRINT" go first ...";
170 GOSUB900:GOSUB1200
190 IF PL=1 THEN 500
200 'computer's turn
205 IFEX=0THENIR=5:IC=0:GOSUB600:PRINT@Q
,"Now its my turn";:GOSUB900:PL=2
206 PRINT@Q,STRING$(17," ");
210 EX=0:GOTO240
220 J1=(4ANDN(1)+(4ANDN(2)))/4:J2=(2ANDN
(1)+(2ANDN(2))+(2ANDN(3)))/2:J3=(1ANDN(1
)+(1ANDN(2))+(1ANDN(3))):IFINT(J1/2)*2=J
1ANDINT(J2/2)*2=J2ANDINT(J3/2)*2=J3THENS
T=0ELSEST=1
230 RETURN
240 GOSUB220:IFST=0THEN300 ELSE M1=0:M2=
0:X=0
250 FORI=1TO3
260 IFN(I)=0THEN290
265 FORJ=1TON(I):IF X=1 THEN 280
270 Z=N(I):Y=N(I)-J:N(I)=Y:GOSUB220:IFST
=0THENM1=I:M2=J:X=1ELSEN(I)=Z
280 NEXTJ
290 NEXTI
295 IFX=1THEN400
300 'pick randomly
320 I=RND(X(CM))*10:IFI>0ANDI<4THENM1=IE
LSE320
325 IFN(M1)=0THEN320
330 I=RND(X(CM))*10:IFI>0ANDI<N(M1)+1THE
NM2=IELSE330
350 N(M1)=N(M1)-M2
400 'print computer's move
410 IR=2:IC=0:GOSUB600:PRINT@Q,"My move
is:";:GOSUB900
420 IR=4:GOSUB600:PRINT@Q,"Row #";USING"
#";M1;:GOSUB900
430 IR=5:GOSUB600:PRINT@Q,"Number =";M2;
:GOSUB900
440 GOSUB1000:IR=7:IC=0:GOSUB600:PRINT@Q
,"Press any key ...";:A$=INPUT$(1)
450 CLS:GOSUB1000
460 GOSUB700
500 'player goes
505 GOSUB220:PL=1
507 IR=3:IC=0:GOSUB600:PRINT@Q,"Your Mov
e --";
510 IR=5:IC=0:GOSUB600:PRINT@Q,"Enter Ro
w (1-3):";
520 A$=INPUT$(1):X=VAL(A$):IF X<1 OR X>3
 THEN 520
530 IF N(X)<1 THEN 520 ELSE N=X:PRINTA$;
535 IR=1+2*X:IC=34:GOSUB600:PRINT@Q,"<--
";
540 IR=6:IC=0:GOSUB600:PRINT@Q,"How many
 ? ";
550 A$=INPUT$(1):X=VAL(A$):IF X<1 OR X>N
(N) THEN 550
555 PRINTA$;:GOSUB900:FORI=1TO6:IR=I:IC=
0:GOSUB600:PRINT@Q,STRING$(17," ");:NEXT
I
560 IR=5:IC=3:GOSUB600:PRINT@Q,"O.K.";
570 N(N)=N(N)-X:GOSUB900:CLS:GOSUB1000:G
OSUB700:GOTO200
600 ON CM GOTO 610,620
610 Q=IR*80+IC
615 GOTO630
620 Q=IR*40+IC
630 RETURN
700 'test for end
710 IFN(1)=0ANDN(2)=0ANDN(3)=0THENONPLGO
TO720,750ELSERETURN
720 'player wins
730 MS$="      I don't believe you beat
me!":GOTO770
750 'computer wins
760 MS$="Tough luck buddy, better luck n
ext time!"
770 CLS:IR=3:IC=0:GOSUB600:PRINT@Q,"";:F
ORI=1TOLEN(MS$):PRINTMID$(MS$,I,1);:FORJ
=1TO300:NEXTJ:NEXTI
800 GOSUB900:CLS:IR=3:IC=12:GOSUB600
810 PRINT@Q,"Want to try again : ";:A$=I
NPUT$(1)
820 IFA$="Y"ORA$="y"THENRUNELSEIFA$="n"O
RA$="N"THENMENUELSE810
900 FORI=1TO3000:NEXTI:RETURN
1000 FOR I=1 TO 3:N=N(I):P=P(I):IR=P/40:
IC=P-IR*40:GOSUB600:GOSUB 1100:NEXT I
1010 RETURN
1100 PRINT@Q,STRING$(14," ");:PRINT@Q,""
;:IFN=0THENRETURNELSEFORJ=1TON:PRINTCHR$
(147)" ";:NEXTJ
1110 RETURN
1200 IR=3:IC=0:GOSUB600:PRINT@Q,STRING$(
20," ");:IR=5:GOSUB600:PRINT@Q,STRING$(2
0," ");:RETURN
```

This Test Will Help Your Kids

One of the best uses for a microcomputer is its ability to drill youngsters in basic fundamentals. The program listed below, *TEST*, is a perfect example of a simple way to accomplish the drilling process with your Portable Computer.

The program will easily run in an 8K system, provided you don't try to cram too many questions and answers in the DATA statements. In addition, it's a good way to get some of the younger members of the family involved in computing.

Two areas of the program will require some intervention by you. The first is in Line 400, where the number of what we call "Data Pairs" are set. As you will see in the listing, Line 400 is set to three of these data pairs. To expand the program, merely change the 3 in Line 400 to the number of questions you want to ask.

The other area is, of course, in setting up the questions and answers. One question and one answer constitute a "Data Pair." In each pair, the question is given first, then the answer in the format of a DATA statement.

In the *TEST* program, the DATA lines begin with Line 600 and look like this:

```
600 DATA "SPELL Four","Four"
610 DATA "SPELL Five","Five"
620 DATA "SPELL Six","Six"
```

What is happening here is that Line 600 is the first question, which is "SPELL Four." The answer is, of course, "Four." If the test-taker spells the word correctly, the Portable Computer will print "CORRECT." If spelled wrong, it will print "INCORRECT" and the correct spelling of the word. The test-taker also has the option of determining how many questions he/she will be asked.

We have arbitrarily decided to enclose the questions and answers in quotes in the DATA statements. This is *not* necessary for a question and answer format of this sort. However, if either the questions or the answers are to contain commas, then it will be *necessary* to use the quotes. The reason for this is because BASIC recognizes a comma as setting apart items in a data list.

In other words, you do not have to put just one question and answer on a line. You could just as easily use this construction (and we will eliminate the quotes here for illustration):

```
600 DATA Spell Four, Four, Spell Five, Five, Spell Six, Six
```

Both constructions work the same way, provided you do not use commas in the questions or answers.

Pitfalls

The primary drawback of a program of this type is that it requires the test-taker to answer the question *exactly* as the programmed answer. This is, frankly, excellent for foreign language word drill, math programs and testing things like history dates. It can be used very effectively in spelling, too, provided the student knows the definition of the words. Then, the question should be the definition, and the test-taker must type in the answer with the correct spelling.

Because of this, the program is not particularly suited to asking a student to define a word, unless the definitions are simple. For instance, if the student were asked for the event which occurred in 1066, and you had programmed the answer to be "Battle of Hastings", a response of "The Battle of Hastings" or, even "Battle Of Hastings" (large "O" on "Of") would be judged wrong by the computer. This could be frustrating to a test-taker, especially when the program features a "score" at the end.

A better way to handle this would be to have the computer ask "When Was The Battle of Hastings Fought?" and let the test-taker respond with "1066." Computers *are* literal.

Backwards Questions

The random question-generating feature of this program eliminates one of the biggest problems encountered with students who drill themselves—they don't memorize answers; instead, they memorize the *order* in which the answers come. By randomizing the questions, this is not possible for them to do.

However, many students also memorize answers one way (forwards) and not the other (backwards). As an example, a student may know that "gracias" means "thank you," but may not be able to answer the question the other way—as in "How do you say 'Thank You'?"

Backwards questions can be easily programmed in by including them twice, simply reversing the question and answer in the data pair. An example of this technique is:

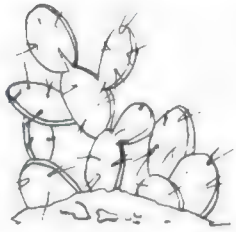
```
600 DATA gracias, thank you, thank you, gracias
610 DATA casa, house, house, casa
```

We have used this program to drill in French with an appreciable increase in student vocabulary test scores.

The listing:

```
1 ' ************************************
2 ' *              QUIZ                *
3 ' *    FOR THE TRS-80 MODEL 100      *
4 ' *           Adapted by             *
5 ' *           L. C. Falk             *
6 ' ************************************
7 '
10 INPUT "Your Name";NA$
20 FOR ZZ=1 TO 1000:READ Q$:IF Q$="END"
THEN 30 ELSE Y=Y+1:READ A$:NEXT
30 CLS:PRINT:PRINT"   Hello, "NA$"!":PRI
NT:PRINT" This is a test program. Would
 you liketo be tested?":INPUT"    Please
 answer [Y]es or [N]o ";YN$
32 IF YN$="N" OR YN$="n" THEN END
33 CLS: PRINT"  If you answer the quest
ions right,   you will get another. If y
ou answer     wrong, the computer will s
how you the   right answer.":PRINT"   If
 you SPELL the answer wrong, it    will
be wrong."
34 FOR WQ=1 TO 3000:NEXT WQ:FOR WQ=1 TO
10:CLS:PRINT@167,"     HERE WE GO!!!":NE
XT WQ
70 CLS:PRINT:PRINT"   How many questions
 do you want to    try?":INPUTN
80 DIM S(N)
90 C=0
100 N1=0
110 '
120 RESTORE
230 IF C=N THEN 550
240 C=C+1
350 CLS:PRINT
360 PRINT "Question #"C
370 PRINT STRING$(12,"-")
380 PRINT
400 X=INT(N*RND(1))+1
420 S(X)=1
430 FOR Q=1 TO X
440 READ Q$, A$
445 IF Q$="END" THEN C=C-1:GOTO120
450 NEXT Q
460 PRINT Q$
470 INPUT R$
480 IF R$=A$ THEN PRINT "C O R R E C T !
!":N1=N1+1:PRINT@285,"";:LINEINPUT"Press
 <ENTER> To Continue";AZ$:GOTO 110
490 CLS:PRINT "INCORRECT ANSWER!":PRINT:
PRINT"  The Correct Answer Is. . . . . .
 . ."
500 PRINT"   "A$:PRINT@285,"";:LINEINPUT
"  Press <ENTER> To Continue";AZ$:GOTO11
0
550 CLS:PRINT:PRINT"   Well, "NA$". . ."
:PRINT:PRINT"   Of"N" questions, you ans
wered"N1"     right."
560 P=(N1/N)*100:PRINT:PRINTUSING"   Tha
t's ###% Right!";P:END
600 '******** Q&A's GO HERE ********
601 DATA THANK YOU,GRACIAS,GRACIAS,THANK
 YOU
602 DATA CASA,HOUSE,HOUSE,CASA
603 DATA AFTERNOON,TARDE,TARDE,AFTERNOON
604 DATA NOCHE,NIGHT,NIGHT,NOCHE
605 YOU'RE WELCOME,DE NADA,DE NADA,YOU'R
E WELCOME
606 DATA YES,SI,SI,YES
607 DATA NO,NO,NO,NO
608 DATA MADRE,MOTHER,MOTHER,MADRE
609 DATA PADRE,FATHER,FATHER,PADRE
610 DATA TAZA,CUP,CUP,TAZA
611 DATA ESCRITO,PEN,PEN,ESCRITO
612 DATA DONDE,WHERE,WHERE,DONDE
613 DATA HOMBRE,MAN,MAN,HOMBRE
614 DATA NINA,BABY,BABY,NINA
615 DATA HERMOSA,SISTER,SISTER,HERMOSA
616 DATA HERMOSO,BROTHER,BROTHER,HERMOSO
617 DATA BONITA,PRETTY,PRETTY,BONITA
618 DATA LIBRA,BOOK,BOOK,LIBRA
619 DATA COCHE,CAR,CAR,COCHE
620 DATA BUENO,GOOD,GOOD,BUENO
621 DATA MUJER,WOMAN,WOMAN,MUJER
622 DATA DINERO,MONEY,MONEY,DINERO
623 DATA ONE,UNO,UNO,ONE
624 DATA TWO,DOS,DOS,TWO
625 DATA THREE,TRES,TRES,THREE
626 DATA QUATRO,FOUR,FOUR,QUATRO
```

PCM



PRICKLY-PEAR SOFTWARE
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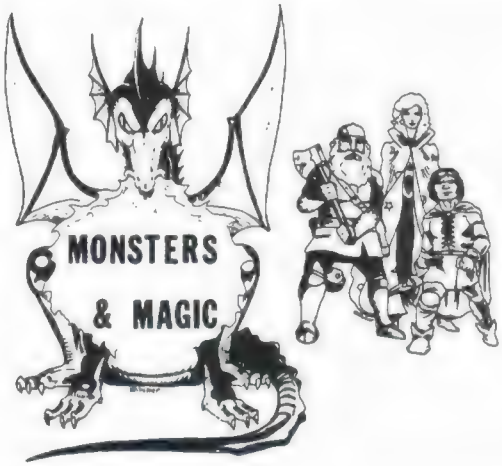

Monsters & Magic

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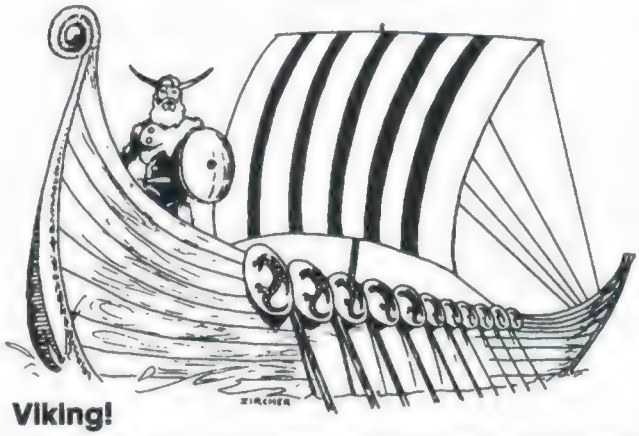
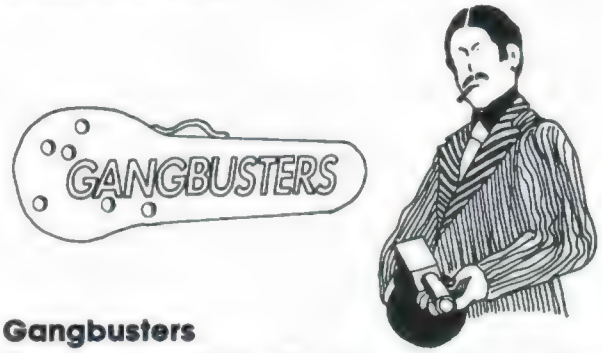


Viking!

A simulation for 1 to 4 persons. Each begins as a landowner, and by farming their land, buying and selling land, expanding their fishing fleet, building on to their manufactory, increasing their population, equiping and training more soldiers, and regulating their taxes, each player tries to increase their economic power and rank until one becomes ruler over all. But beware plagues, rats, raiders, revolts, bad weather, and other misfortunes which may lie along the road to success. As you progress, see the map of your holdings increase. Playable in 1 to 2 hours, and different every time, you may have an addiction problem. **$19.95 tape — 24K**



Gangbusters

If you ever wanted to try a life of crime, this is your chance. You will start out as a Punk, but by using brains, and a little muscle, you can rise to become a Hood, Runner, Bookie, Torpedo, Fence, Kingpin, or win by becoming Syndicate Boss. Indulge yourself. Bribe a judge, or the District Attorney. Pay off the Cops. Take out a contract on another player, but watch out, they may be after you. Buy trucking companies, bootleg operations, houses of ill fame, but remember, if you get caught, you may do some hard time. Do you have what it takes to take over? This game will keep you close to your rod, get you thinking about bulletproof glass in your car, and definitely bring out the worst in you, but you'll love every minute of it. For 2 to 6 players, takes about 2 hours to play. Every game is excitingly different. **$19.95 tape — 24K**

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On The Road

By Robert Frowenfeld
PCM Contributing Editor

The emphasis of this column will be on programs that can be used when the Model 100 user is exactly that: on the road. Away from plotters, printers, telephones and the like; out in the wilderness, perhaps with nothing around you except the hum of the bees. Whether you're on a plane, or just simply want to relax with your PoCo, this column will provide you with both interesting and useful programs. Our first article for "On The Road" will make the Model 100 generate a loan amortization schedule.

Say you want to buy a car, or a house, or maybe you're wondering how much money you can borrow if you're willing to plop down $250 a month for six months to buy your girl the diamond ring she swears she won't marry you without. Well, this program will do it all for you. It's a loan amortization program—the same type used by financial institutions (and your local friendly car dealer) to determine the periodic payments as well as principle and interest credits during the life of a loan.

The program listed below can be used in one of three ways: to find the periodic payment, to determine the amount of money that can be borrowed (loaned), or to compute the number of periods to repay a borrowed (or loaned) amount of money.

(Robert Frowenfeld owns his own computer programming firm in Louisville, Ky., and has completed his graduate coursework in Computer Science at the University of Louisville.)

In each instance the interest rate must be supplied; it is always typed in as a whole number, not as a percentage. For example, if the interest rate is 12.5 percent annually, it should be entered as 12.50 and *not* as 0.125. After the input is complete, the program prints out an amortization schedule, breaking down each period's payment into its principle and interest components. This comes in handy at tax time when you need interest payment figures for your itemized deductions. At the end of the program are printed totals for the amount of principle and interest paid out over the entire life of the loan.

When it is required to compute the periodic payment, the user must enter the amount of the loan (the principle) and the number of periods required to repay the loan. You will notice that I constantly refer to the time between payments as "periods" and not "months." There's no particular reason for this other than the fact that nowhere is it written that a payment occurs once a month. It could be once a quarter, once a week, or once a year. The program *does* assume that there are 12 payment periods per year, but this can be changed by redefining the variable "PY" on line 15 to be the number of payment periods per year.

The second way the program can be used is to determine the amount of money that can be loaned or borrowed. The information required here is the amount of money to be paid in each period and the total number of payments. This method can prove to be rather handy.

The last mode of running this program is to supply the loan amount along with the required payment to compute the number of pay periods.

An example of each of the three modes of operation is illustrated below, but first a quick lesson in algebra to show how the program works. The basic formula for computing the periodic payment is:

P=V/((1+I)↑(-N))/I)

Where: P = periodic payment
V = loan value (principle)
I = interest rate (per period)
N = number of periods

**Note: the character "↑" means "raised to the power."

Solving this equation for 'V,' the principle yields the formula:

V=P*((1-(1+I)↑(-N))/I)

In order to solve for the number of periods (given the principle 'V' and the payment 'P') requires some fancy footwork. The variable 'N' is used as an exponent in the equation and therefore the log of both sides of the equation must be taken. Using the first equation above yields:

P=V*I/(1-(1+I)↑(-N))

This reduces to:

V*I/P=1-(1+I)↑(-N) and

which becomes V*I/P-1=-(1+I)↑(-N)

Taking the log of each side:

LOG(-(V*I/P-1))=-N*LOG(1+I)

And finally:

N=-LOG(-(V*I/P-1))/LOG(1+I)

This is performed by lines 300-310 of the program.

One last note: The variable 'PT$' is

initialized on line 15 to a value of 'N'; if a printout is desired along with the video output, change this value to 'Y.'

Well, there you have it. Follow the example below and give it a try with your own numbers. Who knows? Maybe you can afford that new house after all!

```
Interest Rate  : 10.00%
Loan Value     :$  2,000.00
# of Payments  : 24
Monthly Payment:$   92.29

Pmt#  Principle    Interest     Balance
----  ---------    --------    ---------
   1        75.62       16.67    1,924.38
   2        76.25       16.04    1,848.13
   3        76.89       15.40    1,771.24
   4        77.53       14.76    1,693.71
   5        78.18       14.11    1,615.53
   6        78.83       13.46    1,536.70
   7        79.48       12.81    1,457.22
   8        80.15       12.14    1,377.07
   9        80.81       11.48    1,296.26
  10        81.49       10.80    1,214.77
  11        82.17       10.12    1,132.60
  12        82.85        9.44    1,049.75
  13        83.54        8.75      966.21
  14        84.24        8.05      881.97
  15        84.94        7.35      797.03
  16        85.65        6.64      711.38
  17        86.36        5.93      625.02
  18        87.08        5.21      537.94
  19        87.81        4.48      450.13
  20        88.54        3.75      361.59
  21        89.28        3.01      272.31
  22        90.02        2.27      182.29
  23        90.77        1.52       91.52
  24        91.52        0.76        0.00
Total Interest : $ 214.95
Total Principle : $ 2,000.00
```

The listing:

```
10 'Loan amortization program
15 PY=12:PT$="N"
20 F1$="###    #,###.##   #,###.## ####,
###.##"
25 F2$="Pmt#  Principle   Interest    Ba
lance
30 F3$="----  ---------   --------   ---
------
35 CLS
40 PRINT@0,"Interest Rate  : ";
45 LINE INPUT RT$:RT=VAL(RT$):IF RT<=0 O
R RT>100 THEN GOTO 10 ELSE PRINT@16,USIN
G" ##.##";RT;
50 PRINT"%":XI=RT/(PY*100)
55 PRINT@40,"Loan Value     : ";:LINEINP
UT VL$:VL=VAL(VL$):IF VL<0 THEN GOTO 55
60 IF VL<>0 THEN PRINT@56,USING"$###,###
.##";VL
65 PRINT@80,"# of Payments  : ";:LINEINP
UT PR$:PR=VAL(PR$)
70 IF PR=0 AND VL=0 THEN 10
75 IF RT=0 OR VL=0 OR PR=0 THEN PRINT@12
0,"Monthly Payment: ";:LINEINPUT PM$:PM=
VAL(PM$)
80 IF PM=0 AND (VL=0 OR PR=0) THEN GOTO
10
85 IF PM=0 THEN GOTO 90 ELSE IF RT=0 THE
N GOTO 200 ELSE IF VL=0 THEN GOTO 250 EL
SE GOTO 300
90 A#=VL/((1-(1+XI)^(-PR))/XI)
95 GOSUB 700:PM=A#
100 PRINT@120,"Monthly Payment:$";USING"
#,###.##";PM;
150 GOTO 500
200 GOTO 10
250 XI=RT/1200
260 A#=PM*((1-(1+XI)^(-PR))/XI)
265 GOSUB 700:VL=A#
270 PRINT@56,USING"$###,###.##";VL;
280 GOTO 500
300 A=VL*XI/PMT-1:B=1+XI
310 PR=-LOG(-A)/LOG(B)
320 IF PR>INT(PR) THEN PR=INT(PR)+1
330 PRINT@97,USING"###";PR;
500 PRINT@240,"Press any key to continue
 ";
501 A$="":A$=INKEY$:IF A$="" THEN GOTO 5
01
503 IF PT$="Y" THEN PRINT@240,STRING$(38
," ");:LCOPY
505 PRINT@240,F2$:PRINTF3$
506 IF PT$="Y" THEN LPRINT F2$:LPRINT F3
$
510 K=0:NP=0:TI=0:TP=0:VV=VL
515 FOR I=1 TO PR:NP=NP+1:GOSUB 600
520 PRINT USING F1$;I;XB;XA;XC
525 IF PT$="Y" THEN LPRINT USING F1$;I;X
B;XA;XC
527 A$="":A$=INKEY$:IF A$=""THEN 530
528 A$="":A$=INKEY$:IFA$=""THEN528
530 NEXT I
540 PRINT:IF PT$="Y" THEN LPRINT
550 PRINT"Total Interest : $";TI:IF PT$=
"Y" THEN LPRINT "Total Interest : $";TI
555 PRINT"Total Principle: $";USING"##,#
##.##";TP
557 IF PT$="Y" THEN LPRINT "Total Princi
ple : $";USING"##,###.##";TP
560 PRINT:END
600 A#=VL*XI:GOSUB 700:XA=A#:IF NP=PR TH
EN XB=XC:XC=0
610 IF NP<>PR THEN XB=PM-XA:XC=VL-XB:VL=
VL-XB
620 TI=TI+XA:TP=TP+XB
630 RETURN
700 A#=INT(100*(A#+.005001#))/100:RETURN
```

SOFTWARE

Blockade Requires Some Fast Fingers

Aha, a game for the Portable Computer. *A game?* Yes, a game.

Actually, *Blockade* is the first of a package of several games from Silverware, the same people who are behind the very popular *Chromasette* and CLOAD tape and disk "magazines" for the Models I, III and Color Computer. As usual, their offerings are good.

I believe that *Blockade* proves that there will be no problem with games for the Portable Computer. This one is patterned after an arcade-type game and I want to say that it takes a bit of practice to get going. Even after that happens, *Blockade* is a challenge!

The game is simple in principle: You are a little snake on the screen and, using four keys, can move up or down, left or right. The object is to "hit" little targets as they appear randomly on the screen. They remain for random periods of time, too.

Each time you do manage to "hit" a target, you get a number of points. And, while this sounds easy, it isn't. The reason for that, simply, is because you can't touch the sides of the screen nor can you "doubleback" on yourself.

Now, this may sound easy, but it is not. And, that is especially so because, as the saying goes, the better you get the more difficult things get to be. In short, your little snake grows to be a big snake as you begin to accumulate points. You run into the ever-increasing danger of doubling back over yourself — thereby losing points and moving closer to the end of the game.

Blockade can be played with one or two players and has three levels of difficulty. That makes it a handy way to learn and impress your friends at the office (or your seatmate on an airplane).

You lose five points when you run into something other than a target — be that the side of the board, your own snake or the other snake. You get a random number of points for each target hit. And the first person to reach 100 points wins. However, the first person to get minus-100 points loses, so you can win *Blockade* without reaching 100 yourself.

The one-player game is a real challenge and the two-player game can get fast and furious. All in all, *Blockade* is fun to play.

Blockade comes on a tape with three other offerings, *Reversi*, *Frankenstein Adventure* and *Alexis Adventure*. All are specially formatted for the Model 100 and the remainder will be reviewed in future issues of *PCM*. Stay tuned.

Silverware, P.O. Box 21101, Santa Barbara, CA 93121, $24.95 plus $1 shipping with three other games on same tape.)

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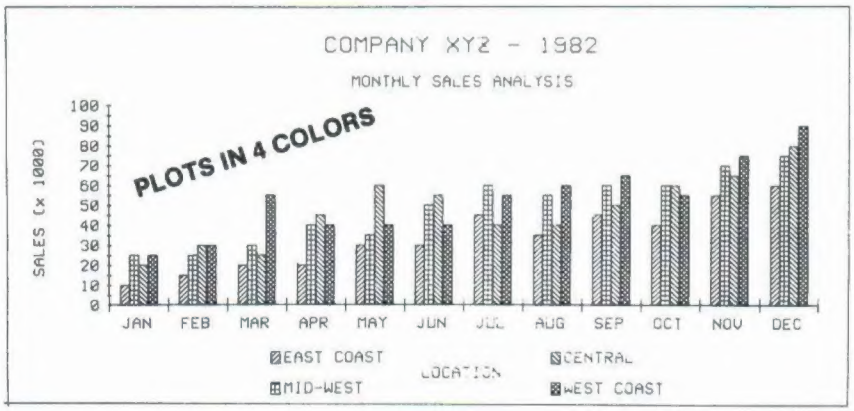

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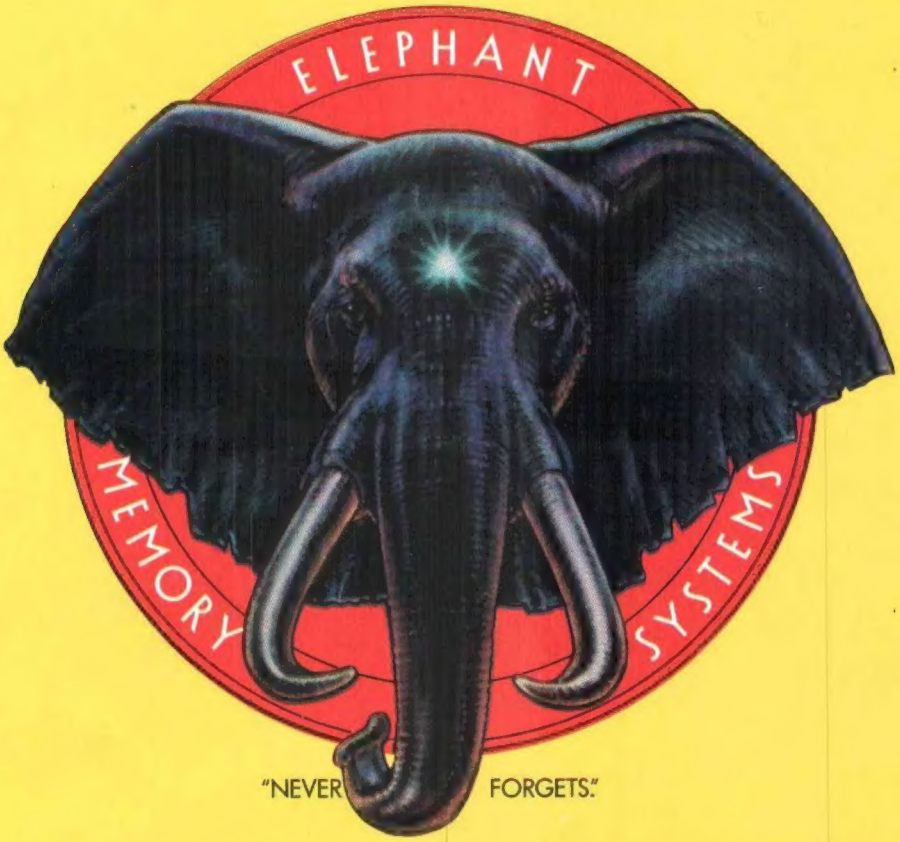

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